

WHAT IS CLAIMED IS:

1. A repeater system for a wireless communication system comprising:
- a first antenna operable to transmit an uplink radio frequency (RF) signal to, and receive a downlink RF signal from, a base station antenna;
 - a first duplexer connected to said first antenna and operable to receive the downlink RF signal from said first antenna and direct the downlink RF signal to a first duplexer output, and further operable to receive an amplified uplink signal at a first duplexer input and provide the amplified uplink signal to said first antenna for transmission to the base station antenna;
 - and
 - a first digital channelizer operable to receive a wideband downlink signal including a plurality of downlink signals each having a different frequency, and digitally isolate a single downlink signal from among the plurality of downlink signals and provide the isolated downlink signal at a first digital channelizer output,
- wherein the wideband downlink signal comprises a narrower band of frequencies than the downlink RF signal.

2. A repeater system as claimed in claim 1, further comprising:
- a second antenna operable to transmit a downlink radio frequency (RF) signal to, and receive an uplink RF signal from, a mobile communication unit;
 - a second duplexer connected to said second antenna and operable to receive the uplink RF signal from said second antenna and direct the uplink RF signal to a second duplexer output, and further operable to receive an amplified downlink signal at a second duplexer input and provide the amplified downlink signal to said second antenna for transmission to the mobile communication unit; and

a second digital channelizer operable to receive a wideband uplink signal including a plurality of uplink signals, and digitally isolate a single uplink signal from among the plurality of uplink signals and provide the isolated uplink signal at a second digital channelizer output,

wherein the amplified downlink signal is an amplified version of the isolated downlink signal and the amplified uplink signal is an amplified version of the isolated uplink signal.

3. A repeater system as claimed in claim 2, wherein said first digital channelizer comprises:

an analog to digital converter for converting the wideband downlink signal from an analog format to a digital format;

at least one digital down converter operable to convert a digital wideband downlink signal of a specified frequency to a baseband quadrature version of the digital wideband downlink signal of the specified frequency; and

a digital signal processor for controlling said at least one digital down converter to operate at the specified frequency.

4. A repeater system as claimed in claim 3, wherein said first digital channelizer further comprises:

at least one digital up converter operable to receive the baseband quadrature version of the digital wideband downlink signal and produce a recreated wideband signal at the specified frequency; and

a digital to analog converter for converting the recreated wideband signal from a digital format to an analog format.

5. A method for transmitting and receiving radio frequency (RF) signals comprising:

receiving a downlink RF signal from a base station antenna;
directing the downlink RF signal to a first digital channelizer;
digitally filtering a plurality of sub bands of frequencies from the downlink RF and separating each sub band into a respective number of channels;
transmitting each of the channels into an area in which the base station, due to an obstruction, cannot transmit signals directly; and
receiving at least one of the channels by a mobile communication unit.

6. A method as claimed in claim 5, further comprising:
receiving an uplink RF signal from a mobile communication unit;
directing the uplink RF signal to a second digital channelizer;
digitally filtering a plurality of sub bands of frequencies from the uplink RF signal and separating each sub band into a respective number of channels; and
transmitting each of the channels to the base station.